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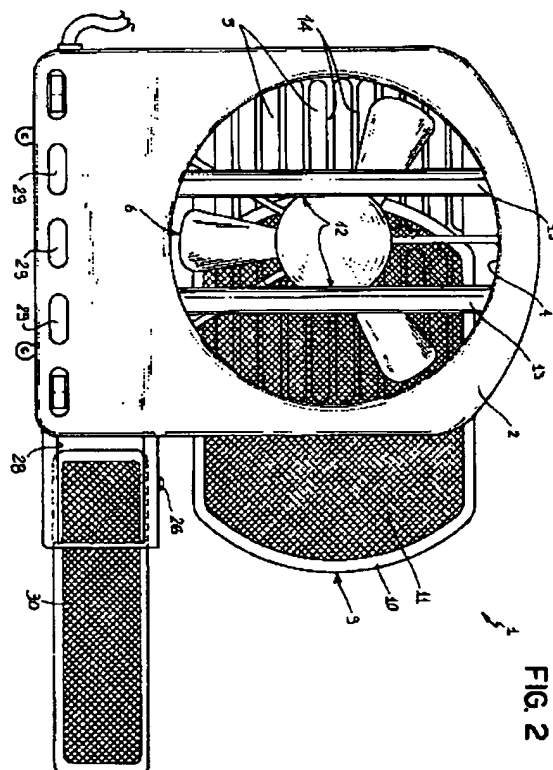
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(54) **Apparatus to capture insects and the like**

(57) The invention relates to an apparatus to capture insects and the like, comprising a holding body (2) defining a main duct (3) having an inlet opening (4) at which a fan (6) operates and an outlet opening (5) to which a filtering element (9) is removably secured. A connecting channel (8) located downstream of the fan brings the main duct into fluid communication with a col-

lection chamber (7) where the insects are stored as they are captured. The main duct (3) comprises a first portion (15) of constant section and a second portion (16) of increasing section away from the inlet opening (4). Finally, the collection chamber (7) is defined by an extractable drawer (20) provided with a closing element (23) that, when the drawer is drawn out, closes the collection chamber (7) to the outside.



## Description

The present invention relates to an apparatus to capture insects and the like, of the type comprising a holding body defining at least one main suction duct having at least one inlet opening and at least one outlet opening; sucking means operating at the main duct and arranged to define an air stream between said inlet opening and outlet opening to take in insects and the like; a collection chamber brought into fluid communication with said main duct downstream of said sucking means and arranged to receive said insects and the like.

It is known that in civil use premises and in many environments intended for industrial use, the requirement of eliminating flying insects such as flies, mosquitoes and so on is becoming increasingly more felt, both due to the great trouble caused by said insects and for obvious hygienic reasons.

For the purpose, in addition to conventional insecticides, different types of devices capable of capturing and optionally substantially eliminating all types of flying insects have been widely used.

In greater detail, devices comprising a light source designed to attract flying insects have been widely used in the past, close to which light source a panel coated with paper having a sticky surface, in particular flypaper, was positioned.

While these types of devices are still widely spread, they however have many operating restrictions. It should be noted in fact that devices of this type can only capture insects that directly rest on the sticky paper. In addition, the captured insects remain attached to the flypaper surface, which brings about clear drawbacks both from the hygienic and aesthetic point of view.

In addition to the above described devices, also widely spread are devices of a second type that provide the use, instead of the flypaper, of a grid of electrical cables capable of inflicting an electrical discharge to the insects coming close to the lamp. These devices however are not always reliable in that they do not succeed in eliminating relatively big insects such as wasps, bees and the like. In addition, these devices very often cause burst of the insect body, so that the different parts of it are dispersed in the surrounding atmosphere, which brings about obvious inconveniences from a hygienic point of view. Finally, the electrical-discharge devices are noisy and irritating and therefore hardly appropriate for domestic premises.

Due to the above listed drawbacks, apparatuses of a different typology have recently had a wide spread, in which the flying insects, when they come close to the apparatus, are swallowed up or drawn into a suction duct and conveyed towards a collection chamber where generally insecticidal and/or germicidal means operates, such as chemicals, lamps, resistors, or other means.

In greater detail, apparatuses of this third type have a holding body internally defining said main suction duct,

in which one or more suction fans operate. Generally, close to the inlet opening of the main duct there is a light source adapted to attract the insects to the apparatus. Disposed downstream of the suction fan is a collection chamber communicating with the main duct and adapted to receive the insects as they are captured. Also provided at the outlet opening of the main duct is a filtering grid integral with the holding body and capable of enabling evacuation of the air stream while at the same time preventing the already captured insects from escaping, so that said insects are lead to move towards the collection chamber. Generally the collection chamber is defined close to an extractable drawer that can be removed from the holding body to enable periodical cleaning operations.

While the apparatuses in accordance with the above typology solve all drawbacks typical of the previously described devices, they too suffer from important operating problems.

It should be noted in fact that the insects that are sucked by turns into the main duct tend to impinge and smash against the filtering grid that necessarily requires a periodical cleaning.

However, as already mentioned, the filtering grid in the apparatuses of known type is integral with the holding body and, as a result, it is very difficult to remove dirt and insects that are gradually deposited thereon without substantially dismantling most of the apparatus in question.

It should be also noted that, since the filtering grid is placed perpendicularly to the propagation direction of the air stream, the captured insects impinge with violence against the grid and adhere to the grid surface. Therefore, it is not possible to increase the speed of the air stream too much, because in this case quick occlusion of the whole filtering grid will occur. Furthermore, since this grid must also perform a protective task, it usually is of great stiffness and therefore cannot mitigate the insects' impacts at all.

Finally, with reference to the extractable drawer, it is pointed out that when the latter is disengaged from the apparatus, the still live insects possibly present in the collection chamber may escape therefrom giving rise to easily conceivable inconveniences.

Under this situation, the present invention aims at devising an apparatus for capturing insects and the like, capable of substantially overcoming all the above mentioned drawbacks.

In particular it is a fundamental object of the invention to provide an apparatus for capturing insects and the like in which provision is made for a filtering element adapted to be easily serviced and cleaned and, at the same time, capable of minimizing the impact violence of the insects as they are captured.

Another object of the invention is to provide an apparatus capable of generating, within the main duct, an air stream of great flow rate without giving rise to problems of quick occlusion of the filtering element and reflux

of air, as a result of said great flow rate.

The foregoing and further objects that will become more apparent in the progress of the present description are substantially achieved by an apparatus for capturing insects and the like, characterized in that it further comprises a filtering element removably fixed to the holding body close to the outlet opening and active on said air stream to substantially inhibit ejection of said insects and the like through the outlet opening itself.

Further features and advantages will be best understood from the detailed description of a preferred embodiment of an apparatus for capturing insects and the like in accordance with the present invention, taken hereinafter, by way of non-limiting example, with reference to the accompanying drawings, in which:

- Fig. 1. is an elevational front view of the apparatus of the invention under operating conditions;
- Fig. 2 is view similar to that of Fig. 1 in which some components of the apparatus are partly drawn out of the holding body;
- Fig. 3 is a sectional view taken along line III-III in Fig. 1;
- Fig. 4 is a diagrammatic sectional view of the extractable drawer associated with the apparatus in question, taken along line IV-IV in Fig. 1;
- Fig. 5 is a sectional view similar to the one in Fig. 4, in which the drawer is partly drawn out;
- Fig. 6 is a sectional view taken along line VI-VI in Fig. 4;
- Fig. 7 is a sectional view taken along line VII-VII in Fig. 2.

Referring to the drawings, an apparatus for capturing insects and the like in accordance with the present invention has been generally identified by reference numeral 1.

Apparatus 1 comprises a holding body, generally denoted by 2, internally defining at least one main suction duct 3 having at least one inlet opening 4 and at least one outlet opening 5. Sucking means 6 operates at the main duct 3 and it consists of at least one suction fan located immediately downstream of the inlet opening 4. The sucking means 6 is adapted to define an air stream between the inlet opening 4 and outlet opening 5 in order to swallow up or draw into body 3, all insects coming close to the inlet opening 4. It is to note that, for the purpose of attracting the insects and make them come close to the apparatus 1, at least one light source 12 is provided which operates in close proximity to the inlet opening 4. In this case, as shown in Figs. 1 and 2, two upright lamps 13 are provided and secured immediately upstream of the fan 6.

Apparatus 1 further comprises a collection chamber 7 in which germicidal means can optionally operate, which chamber is brought into fluid communication with the main duct 3 downstream of the sucking means 6. More particularly, as shown in Fig. 3, the collection

chamber 7 receiving the insects as they are captured is brought into fluid communication with the main duct 3 via a connecting channel 8 preferably formed at a terminal area of the main duct 3.

Advantageously, apparatus 1 further comprises a filtering element 9 removably attached to the holding body 2 close to the outlet opening 5 and active on the air stream to substantially inhibit ejection of the captured insects through the outlet opening.

In more detail, the filtering element 9 is slidably engaged in a through seating 9a formed in a wall of the holding body 2 and therefore it can be easily removed for cleaning and replacement.

It is to be noted that, preferably, the filtering element 9 extends in an inclined plane with respect to an axial advancing direction of the air stream, to deviate the captured insects towards the duct 8 and therefore the collection chamber 7. Due to this particular arrangement of the filtering element 9 the possibility that the insect will impinge on the filtering element 9 surface in a direction perpendicular thereto is also prevented, thereby reducing the impact force of the insects and therefore pulping of same, which would lead parts of the insects to remain attached to the filter surface causing a quick clogging of the filter itself.

Advantageously, the filtering element 9 is provided to be formed of a supporting frame 10 and a filtering cloth 11 perimetrically fixed to the supporting frame. This structure is very efficient in that the filtering cloth, due to its intrinsic deformability, helps in further mitigating the impact force between the filtering element surface and the insects.

In other words, due to the structure of the filtering element 9 and its particular arrangement, the fan 6 can be moved in such a manner that an air stream of a higher flow rate than that of conventional devices of known type is generated, without on the other hand giving rise to an excessive clogging of the filtering element.

Still with reference to the filtering element 9, it is to note that in said element the ratio of the free air-passage port to the cross-sectional area of the main duct at the filtering element is included between 0.2 and 0.6. In an original manner, it could be ascertained that, in order to promote an air stream as much uniform as is possible between the inlet opening 4 and outlet opening 5 and in order to avoid formation of a counter-pressure which is likely to create a return air stream to the inlet opening 4, the ratio of the free passage port of the filtering element 9 to the cross-sectional area of the main duct 3 at the filtering element must be preferably included between 0.3 and 0.5.

Downstream of the filtering element 9 and axially spaced apart therefrom, provision is also made for a protection grid 14 integral with the holding body 2.

In order to improve the efficiency of the apparatus in question as much as possible, the main duct 3 is provided to comprise a first portion 15, of a substantially constant transverse section, and a second portion 16,

following the first portion and of an increasing transverse section away from the inlet opening 4, so as to define a diffuser capable of greatly reducing the air speed, the flow rate being unchanged. It is to note that for an appropriate operation, the ratio between the area of the inlet opening 4 and that of the outlet opening 5 should be at least 0.7. It is apparent that, by virtue of this particular conformation of the main duct 3, the insects reach the filtering element 9 at an appropriate speed even if the flow rate of apparatus 1, and therefore the sucking force of same, is greatly increased.

Preferably, as shown in the accompanying drawings, the first portion 15 of the main duct 3 has a substantially cylindrical conformation, whereas the second portion 16 substantially has the form of a truncated cone. This ensures a good propagation of the air stream generated by the fan 6.

Referring particularly to Fig. 3, it is also to point out that the sucking means 6 is positioned at the first portion of duct 3, whereas the connecting channel 8 and therefore the collection chamber 7 are brought into fluid communication with the second portion of the main duct 3.

Advantageously, operatively interposed between the collecting chamber 7 and the main duct 3 is a closure member 17 inhibiting the fluid communication between the main duct and the collection chamber 7 when the apparatus 1 is under non-operating conditions, in order to prevent the insects possibly present in the collection chamber from escaping.

Preferably, the closure member 17 comprises at least one plate-like element 18 rotatably in engagement with the holding body 2, for example at said connecting channel 8 and movable, upon the action of the air stream, between a closed position, in which it separates the collection chamber 7 from the main duct 3, and an open position, in which it allows a fluid communication between the collection chamber and main duct.

Active on the plate-like element 18 is return means 19 which is arranged to move said element to the closed position so that, in the absence of an air stream, the insects already present in the collection chamber cannot come back to the main duct. In the embodiment herein illustrated, as shown in Fig. 7, the closure member 17 is actually formed of two symmetrically opposed plate-like elements 18. In addition, the return means 19 consists of two counterweights, each of which is directly carried by the respective plate-like element. Clearly, the return means 19 can consist of mere torsion springs as well, and also of other members capable of accomplishing the same function as that described above.

As viewed in particular from Figs. 2 and 3, apparatus 1 also comprises an extractable drawer 20 removably engaged in a preferably horizontal guide seating 21, formed in the holding body below the duct 3. This extractable drawer defines the collection chamber 7 into which the insects are pushed and, for the purpose, it has an access opening 22 facing the connecting channel 8 and therefore the main duct 3.

Advantageously, the extractable drawer 20 comprises a closing element 23 located at the access opening 22 and movable between an open position, at which the extractable drawer is inserted in said guide seating, and a closed position, at which the extractable drawer is partly drawn out of the guide seating. Preferably, as shown in Figs. 4 and 5, the closing element 23 comprises at least one plate 24 carrying out translation at the access opening 22 upon the action of a fixed locator 25 integral with the holding body. More particularly, plate 24 integrally carries one or more sliding pins 26 movable along corresponding guide slits 27 formed in one of the drawer walls. Each sliding pin 26 in turn has a swollen head 26a interfering with said fixed locator 25, consisting for example of a mere rib, thereby causing displacement of the plate from the position in Fig. 4 to that in Fig. 5, following a drawing-out movement imparted to the drawer.

The extractable drawer 20 also comprises one or more discharge ports 28 brought into fluid communication with one or more additional air outlet openings 29 formed in the holding body 2, below the opening 4 for example. Drawer 20 also comprises an auxiliary filtering element 30 removably in engagement with the drawer close to said discharge port 28, to prevent the insects entrapped in the chamber 7 from escaping towards the auxiliary openings 29.

The auxiliary filtering element too is also slidably engaged to advantage in a respective through seating 30a formed in the extractable drawer 20.

Operation of the apparatus for capturing insects and the like according to the invention, described above mainly as regards structure, is as follows.

Under operating conditions, the lamps 13 and suction fan 6 are activated. In particular, the lamps are adapted to attract the insects to the inlet opening 4, so that said insects are captured and entrained by the air stream entering the main duct 3. The thus entrapped insects go on downstream of the fan and reach the filtering element 9 by which they are advantageously deviated towards the connecting channel 8 and then towards the collection chamber 7 within the extractable drawer. As already said, during the suction step, the air stream in the main duct 3 is subjected to an importance slowing down, due to the diffuser-shaped conformation of the second portion 16, thereby obviously reducing the impact speed of the insects against the filtering element 9. It should be also pointed out that the air stream entering the opening 4 is practically divided into one portion coming out of the outlet opening 5 and one portion going on to the collection chamber 7, passing through the discharge port 28 formed in the extractable drawer where the auxiliary filtering element 30 operates and finally coming out of the auxiliary opening 29 formed in the front wall of the holding body.

It is pointed out that until there is an air stream, the plate-like elements 18 of the closure member 17 are rotated downwards (chain line in Fig. 7), thereby ensuring

an appropriate fluid communication between the duct 3 and collection chamber 7.

As soon as the air stream is interrupted, the aerodynamic force pushing the plate-like elements 18 stops and said elements 18, upon the action of respective counterweights, are brought to the closed position (solid line in Fig. 8) thereby separating the collection chamber from the main duct and therefore preventing any insect escape towards the duct.

When the periodical servicing of the apparatus is to be made, the filtering element 9 can be drawn by merely making it slide along the corresponding seating, as shown in Figs. 1 and 2, so that cleaning and replacement of same, if necessary, can be carried out. The same is valid for the auxiliary filtering element engaged close to the discharge port of the extractable drawer.

Drawer 20 too can be drawn out of the holding body by a mere slide action along the respective guide seating 21. During this operation, the closing element 23 moves from the open position to the closed one, thereby preventing the escape of still live insects, if any. More particularly, the head of the pins associated with plate 24 comes to interfere with the fixed locator 25 associated with the holding body. It should be noted that when the plate 24 moves to close the access opening, that is when the pins are at the end of their stroke along the guide slits, further drawing out of the drawer brings the pin head to step over the fixed locator. In this manner, when the drawer is to be reinserted, the fixed locator will act on the opposite side of the head of each pin causing movement of the plate 24 to the open position. It will be understood that also during this step of reinserting the drawer, as soon as the plate reaches the end of its stroke, the fixed locator will step over the slide pin heads again.

The invention achieves important advantages.

Firstly, since both the filtering element 9 and auxiliary filtering element are removably engaged, these components can be easily disengaged from the holding body and the extractable drawer respectively, for carrying out the periodical cleaning and replacement operations.

Positioning of the filtering element 9 in an inclined plane with respect to the air stream direction is also particularly advantageous. In that, in this way, insects are more efficiently deviated to the collection chamber, while at the same time too strong perpendicular impacts against the filtering element surface are avoided. This, as known, results in smashing of the insects' bodies and therefore a quick occlusion of the filtering element.

Taking into account the above point of view, it is also advantageous the fact that the filtering element consists of a cloth that, as such, has a good deformability and therefore a good capability of absorbing shocks due to the impacts of the insects pushed towards the collection chamber, without being subjected to many damages and above all without causing a progressive clogging of the filtering element surface.

Furthermore, the second portion 16 of the main duct 3 reduces the impact speed of the insects on the filtering element, the flow rate being equal.

It should be also recognized that the particular ratio between the free passage area of the filtering element and the cross-sectional area of the main duct at the filtering element represents an excellent compromise between the filtering capacity and the necessity of discharging the incoming air stream in order to avoid a reflux of air to the inlet opening, which clearly would involve a weak efficiency in apparatus 1.

In addition, the closure member 17 is particularly efficient in that the return means, consisting in this case of counterweights, ensures an immediate closure of the collecting chamber as soon as the air stream stops.

It is finally emphasized the great practical character and operating efficiency of the extractable drawer 20, due in particular to the presence of the closing element 23 located at the access opening. In fact, when the insects present in the collection chamber are to be removed, one can act without any problem on the drawer, in that when the latter has been drawn out, the immediate closing of the access opening 22 by the plate 24 occurs. It is to note that the plate 24 is set in movement by a fixed locator 25 consisting of a mere rib the manufacture of which involves practically negligible costs.

Obviously, many modifications and variations may be made to the present invention, all of them falling within the scope of the inventive idea characterizing it.

In particular, it is to note that the described features with reference to the structure of the main duct 3 and the extractable drawer can exist independently of each other and independently of the presence of a filtering element removably fixed to the holding body. In other words, an apparatus for capturing insects and the like can be made substantially similar to those of the traditional type and then said apparatus can be equipped with a duct having a second portion of a diverging conformation away from the inlet opening in order to obtain the advantages explained above with reference to this feature.

Likewise, provision may be made for an apparatus quite similar to those of the known art and further comprising an extractable drawer equipped with a closing element similar to the above described one.

## Claims

1. An apparatus to capture insects and the like, comprising:

- a holding body (2) defining at least one main suction duct (3) having at least one inlet opening (4) and at least one outlet opening (5);
- sucking means (6) operating at the main duct (3) and arranged to define an air stream between said inlet opening and outlet opening to

- take in insects and the like;
- a collection chamber (7) brought into fluid communication with said main duct (3) downstream of said sucking means (6) and arranged to receive said insects and the like,

characterized in that it further comprises a filtering element (9) removably fixed to the holding body (2) close to the outlet opening (5) and active on said air stream to substantially inhibit ejection of said insects and the like through the outlet opening itself.

2. An apparatus to capture insects and the like, comprising:

- a holding body (2) defining at least one main suction duct (3) having at least one inlet opening (4) and at least one outlet opening (5);
- sucking means (6) operating at the main duct (3) and arranged to define an air stream between said inlet opening and outlet opening to take in insects and the like;
- a collection chamber (7) brought into fluid communication with said main duct (3) downstream of said sucking means (6) and arranged to receive said insects and the like,
- a filtering element (9) fixed to the holding body close to the outlet opening and active on said air stream to substantially inhibit ejection of said insects and the like through said outlet opening,

characterized in that said main duct (3) comprises a first portion (15), of a substantially constant transverse section, and a second portion (16), following said first portion, of an increasing transverse section away from said inlet opening (4).

3. An apparatus to capture insects and the like, comprising:

- a holding body (2) defining at least one main suction duct (3) having at least one inlet opening (4) and at least one outlet opening (5);
- sucking means (6) operating at the main duct (3) and arranged to define an air stream between said inlet opening and outlet opening to take in insects and the like;
- a filtering element (9) fixed to the holding body close to the outlet opening and active on said air stream to substantially inhibit ejection of said insects and the like through said outlet opening;
- an extractable drawer (20) removably engaged in a guide seating (21) formed in the holding body to define a collection chamber brought into fluid communication with the main duct (3) to receive said insects and the like,

characterized in that it comprises a closing element (23) disposed close to an access opening (22) of the drawer (20) and movable between an open position, at which the extractable drawer is fitted in said guide seating, and a closed position at which the extractable drawer is at least partly drawn out of the guide seating.

4. An apparatus according to claims 1 to 3, characterized in that said filtering element (9) substantially extends in an inclined plane with respect to an axial advancing direction of said air stream, to deviate said insects and the like to the collection chamber.

5. An apparatus according to claims 1 to 4, characterized in that said filtering element (9) comprises:

- a supporting frame (10) and
- a filtering cloth (11) perimetricaly in engagement with the supporting frame.

6. An apparatus according to claims 1 to 5, characterized in that in said filtering element (9) there is a ratio between the free air-passage port and the cross-sectional area of the main duct at the filtering element.

7. An apparatus according to claim 6, characterized in that said ratio is preferably included between 0.3 and 0.5.

8. An apparatus according to claims 1 to 7, characterized in that said filtering element (9) is slidably engaged in a through slit (9a) formed in a wall of said holding body (2).

9. An apparatus according to claims 1 to 8, characterized in that said sucking means (6) comprises at least one suction fan placed immediately downstream of said inlet opening (4).

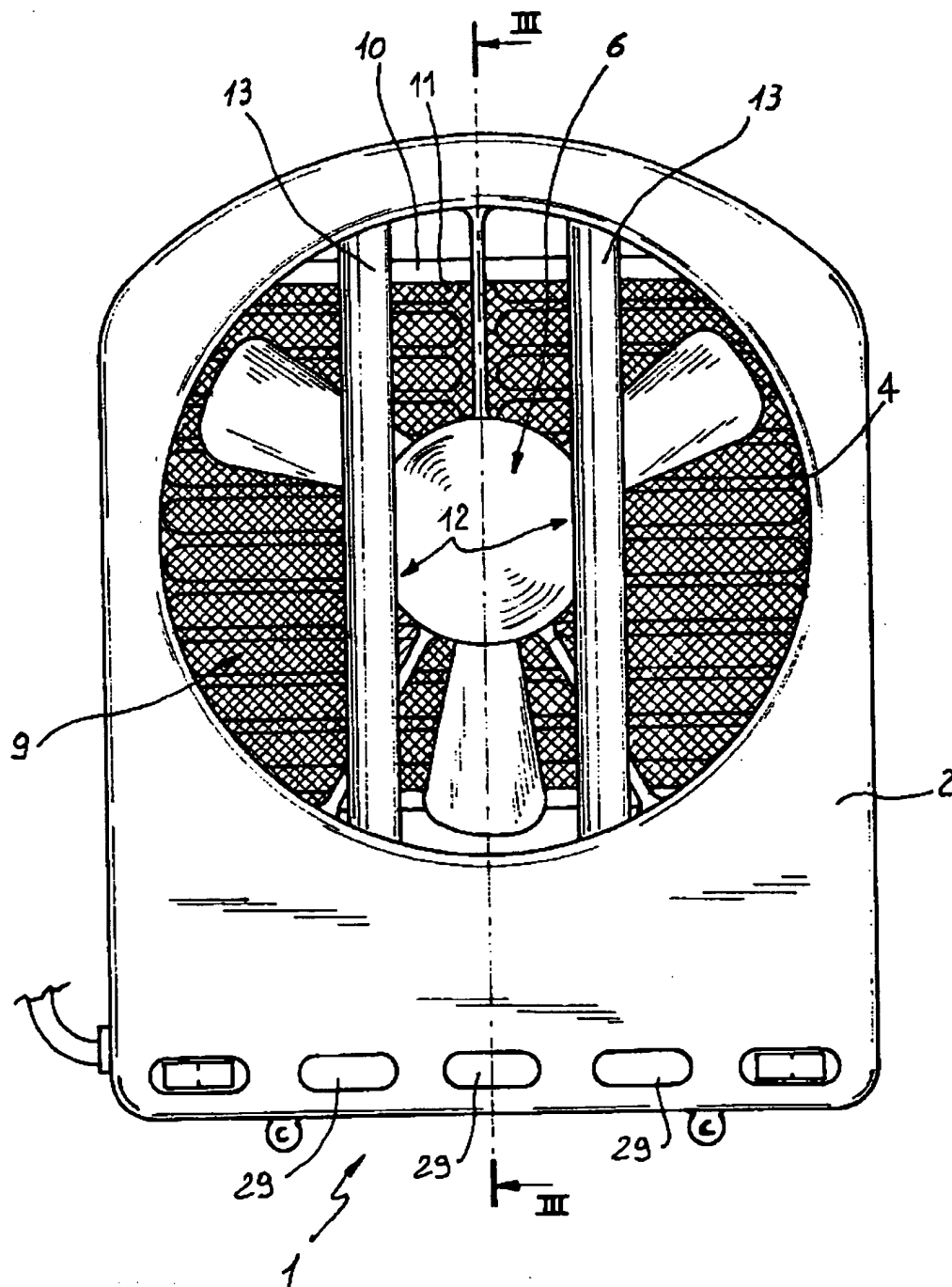
10. An apparatus according to claims 1 to 9, characterized in that it comprises at least one light source (12) operating at the inlet opening (4) and arranged to attract said insects and the like thereto.

11. An apparatus according to claims 1 to 10, characterized in that it comprises a protection grid (14) axially spaced apart downstream of said filtering element and integral with the holding body.

12. An apparatus according to claims 1, 2 and 4 to 11, characterized in that said main duct (3) comprises a first portion (15) of a substantially constant transverse section, and a second portion (16) of an increasing transverse section away from said inlet opening.

13. An apparatus according to claims 1 to 12, characterized in that said first portion (15) has a substantially cylindrical configuration and in that said second portion is substantially in the form of a truncated cone. 5
14. An apparatus according to claims 1 to 13, characterized in that said sucking means (6) operates at said first portion (15). 10
15. An apparatus according to claims 1 to 14, characterized in that said collection chamber (7) is brought into fluid communication with the second portion (16) of the main duct. 15
16. An apparatus according to claims 1 to 15, characterized in that it comprises a first closure member (17) operatively interposed between said main duct (3) and collection chamber (7). 20
17. An apparatus according to claims 1 to 16, characterized in that said closure member (17) comprises:
  - at least one plate-like element (18) rotatably in engagement with the holding body (2) and movable, upon the action of said air stream, between a closed position, in which it separates the collection chamber (7) from the main duct (3), and an open position in which it enables a fluid communication between the collection chamber and main duct; 25
  - return means (19) active on the plate-like element (18) and arranged to move said element (18) to said closed position. 30
18. An apparatus according to claims 1 and 3 to 17, characterized in that it comprises an extractable drawer (20) removably engaged in a guide seating (21) formed in the holding body (2) to define said collection chamber (7). 35
19. An apparatus according to claims 1 to 18, characterized in that said extractable drawer (20) has an access opening (22) facing said main duct (3) for receiving said insects and the like. 40
20. An apparatus according to claims 1 to 19, characterized in that it comprises a closing element (23) disposed at said access opening (22) and movable between an open position at which the extractable drawer is fitted in said guide seating (21) and a closed position at which the extractable drawer is drawn out of said guide seating at least partly. 45
21. An apparatus according to claims 1 to 20, characterized in that said closing element (23) comprises at least one plat (24) carrying out translation at said opening access (22) upon the action of at least one fixed locator (25) integral with the holding body (2). 50
22. An apparatus according to claims 1 to 21, characterized in that said extractable drawer (20) comprises at least one discharge port (28) brought into fluid communication with at least one auxiliary outlet opening (29) formed in the holding body (2), and an auxiliary filtering element (30) removably fixed to the extractable drawer (20) close to said discharge port (28) to inhibit escape of the insects entrapped within the collection chamber (7), towards said auxiliary opening (28). 55
23. An apparatus according to claims 1 to 22, characterized in that said auxiliary filtering element (30) is slidably engaged in a through slit (30a) formed in a wall of said extractable drawer (20).

FIG. 1





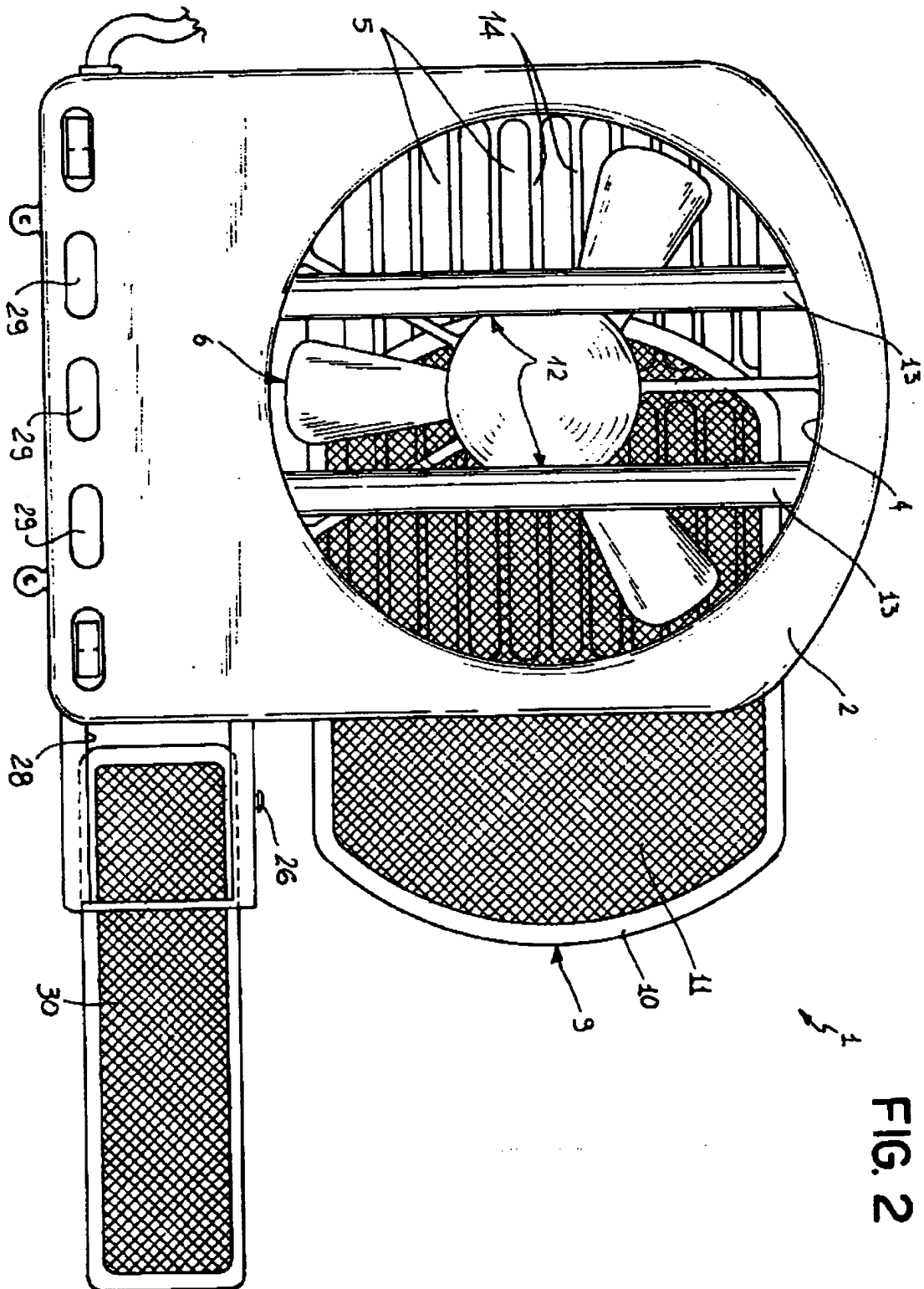
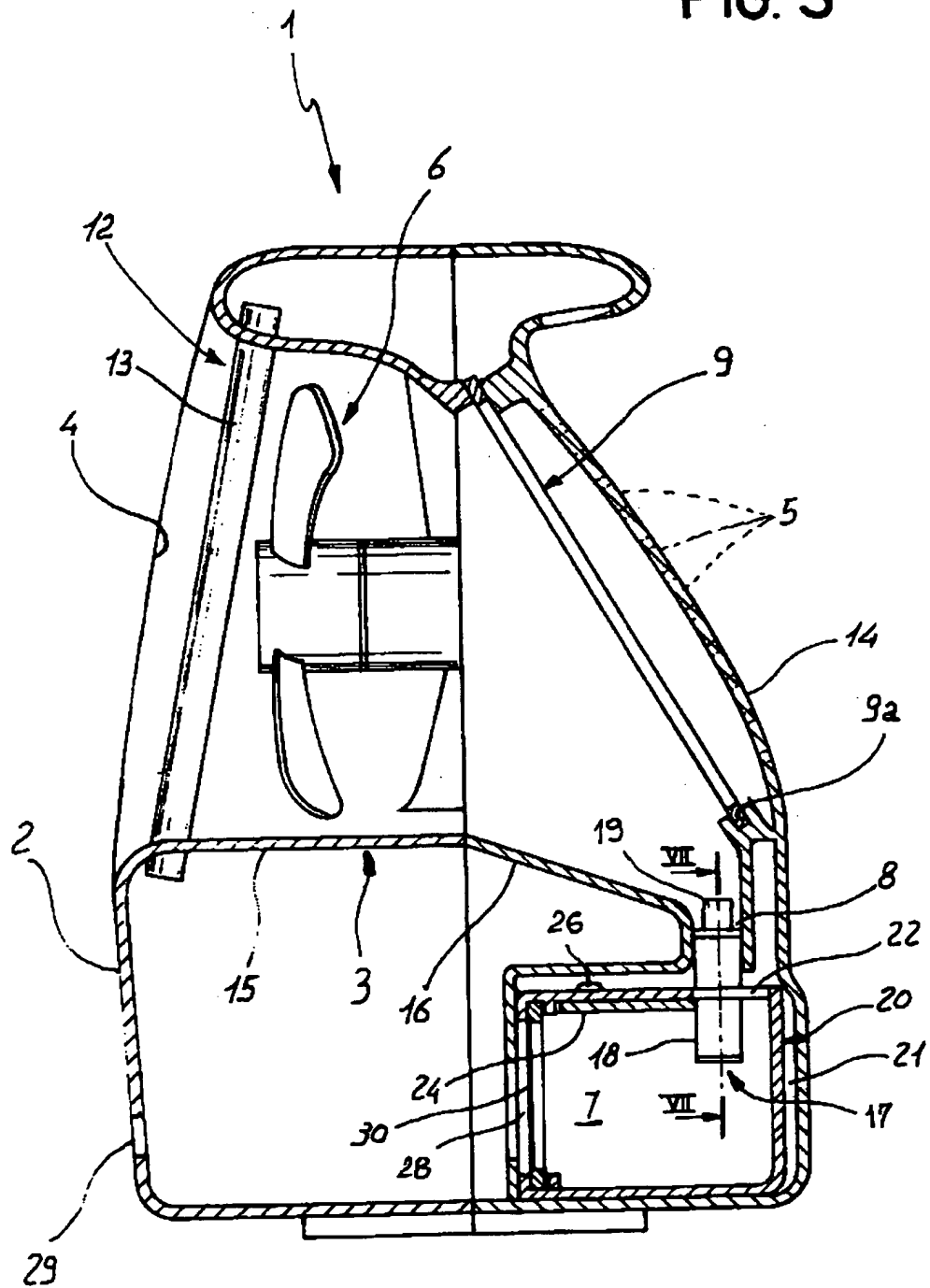


FIG. 2

FIG. 3



**FIG. 4**

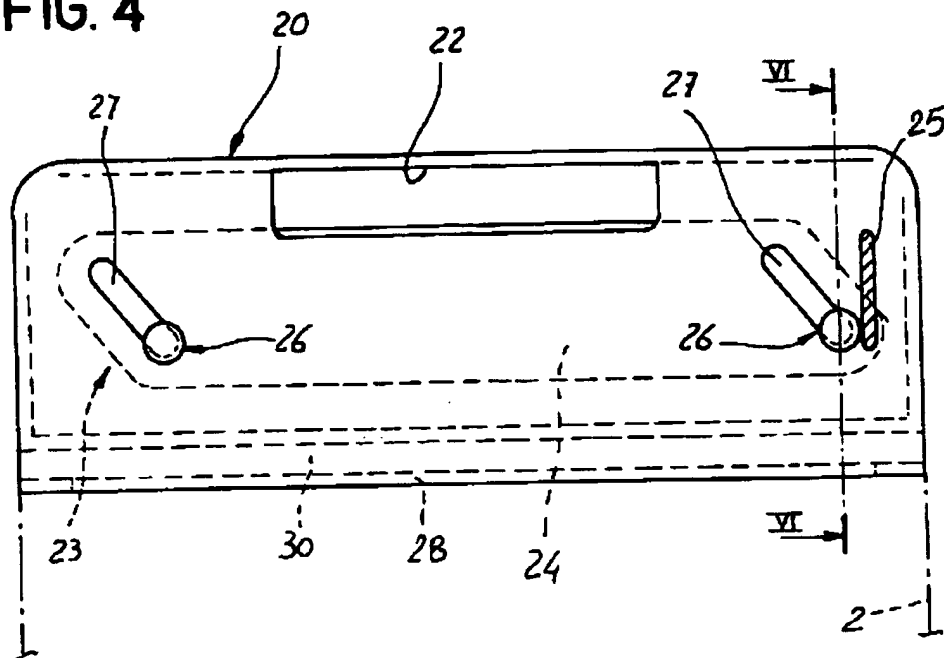


FIG. 5

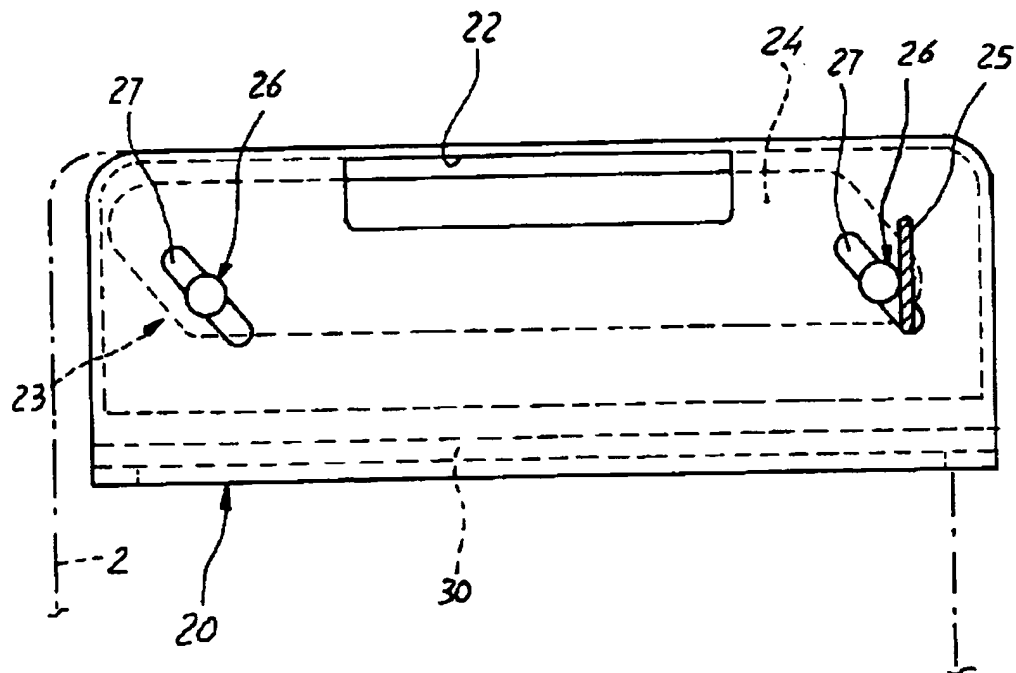


FIG. 6

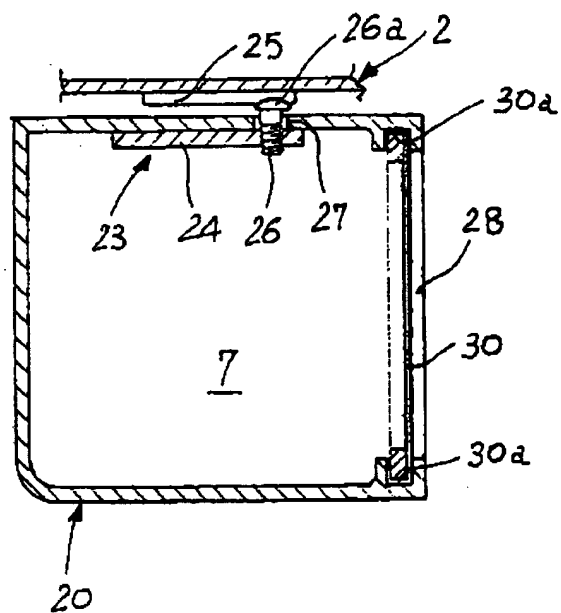
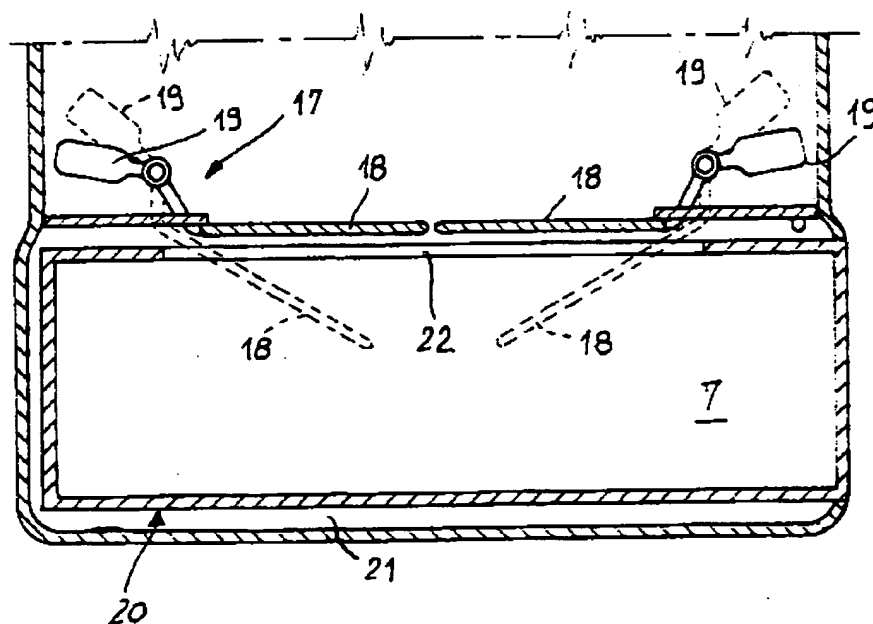


FIG. 7





European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 96 83 0102

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US-A-1 807 550 (RECTOR) * page 1, line 63 - page 3, line 40 * * claims; figures * ---	1,10, 15-20	A01M1/06 A01M1/08
A	FR-A-1 144 520 (LAPIPE) * the whole document * ---	1,10	
A	FR-A-618 847 (BRAIDO) * the whole document * ---	1,10	
A	WO-A-87 06795 (SCHEIBYE) * page 3, line 30 - page 5, line 26 * * claims; figures * ---	2,10	
A	EP-A-0 237 453 (ARIZZI) * claims; figures * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A01M
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30 May 1996	Examiner Piriou, J-C
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